Adaptive Filtering and Prioritising of Diabetes Consumer Information for Promoting Consumer-Provider Partnership and Communication

Chunlan Ma, M.D., M.S., Jim Warren, Ph.D., Jan Stanek, M.D.
Advanced Computing Research Centre, University of South Australia, Adelaide, Australia

Abstract
To engender patient partnership in care we have designed an algorithm to filter and prioritize diabetes consumer information. This enables customised adaptive presentation for patients to highlight the most relevant issues. The profile for adaptation considers significant data (clinical and nonclinical), patient knowledge level and interests. An XML based implementation is the subject of ongoing experimental assessment.

Background Information
In diabetes management, both doctor-patient partnership in diabetes care and communication improves patient compliance and outcome[1-3]. Unlike conventional academic education, patient education is aimed at changing behaviour or health status rather than solely passing knowledge[4]. Prioritising patients information needs is strongly recommended in designing patient education programs[4,5]. Prioritizing reduces the information load for the patient with reduced jeopardy of missing key items. Our overall project goal is to promote doctor-patient partnership and communication by empowering diabetic patients to participate in the health care process more actively. A key to achieving this goal is to provide patients with relevant, prioritised information based on a profile of their information needs. The contents of the profile have been introduced previously[6].

Method
Information Personalisation Process. The information personalisation has two steps: filtering and prioritizing. Information filtering removes content that is irrelevant in light of the patient's profile (e.g., side-effects of drugs the patient doesn't use). Information prioritizing is achieved by matching the patient's profile to rules that assign weights to the information. The rules include three aspects: 1) diabetic significant data; 2) knowledge level; and 3) desired information. Diabetic significant data means factors having adverse effects to management and outcome, such as overweight or smoking. If some significant data for a patient is present, the associated content will have high priority. Patient's knowledge level is anticipated using their phase of coping with diabetes. The knowledge level is stereotyped into phase 1 to phase 3. Phase 1 means patient knows little about diabetes management; phase 2 means they know survival information, but not enough for self-management; phase 3 means they know almost everything in diabetes management. After defining phase, the appropriate information to that phase will have high priority. Patient's desired information means the information that the patient is interested in.

Architecture. Filtering is implemented by three passes of XSLT-based rules of progressive granularity against an XML consumer information base. XML-encoded rules are processed by a custom Java application to apply priorities to the remaining consumer information items. Further Java applications manage the acquisition of patient profile information and interactive presentation to render an adaptive consumer information web portal.

Result and discussion
The major features of this adaptive filtering and prioritizing approach are that it reflects the degree of relevance and importance of the information to the individual patient. The benefits from this approach are that it reduces patient's information load and makes it less likely that the patient will miss the most important information. Field experimentation to evaluate the effectiveness of the information filtering and prioritisation has received ethics approval from the North West Adelaide Health Service.

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